What is claimed is:

1. A method of manufacturing a rare-earth magnet, comprising the steps of:

forming a first protective film including nickel on a magnet body including a rare-earth element through electroplating with a first plating bath including a nickel source, a conductive salt and a pH stabilizer, and having a concentration of the nickel source of 0.3 mol/l to 0.7 mol/l on a nickel atom basis and a conductivity of 80 mS/cm or over; and

forming a second protective film including nickel and sulfur on the first protective film.

2. A method of manufacturing a rare-earth magnet according to claim 1, wherein

the first plating bath including at least one kind selected from the group consisting of nickel sulfate, nickel chlorides, nickel bromides, nickel acetate and nickel pyrophosphate as the nickel source is used.

3. A method of manufacturing a rare-earth magnet according to claim 1, wherein

the first plating bath including at least one kind selected from the group consisting of ammonium sulfate, sodium sulfate,

potassium sulfate, lithium sulfate, magnesium sulfate, ammonium chloride, sodium chloride, potassium chloride, lithium chloride, magnesium chloride, ammonium bromide, sodium bromide, potassium bromide, lithium bromide and magnesium bromide as the conductive salt is used.

4. A method of manufacturing a rare-earth magnet according to claim 1, wherein

the first plating bath including at least one kind selected from the group consisting of boric acid, ammonium borate, sodium borate, potassium borate, lithium borate, magnesium borate and ammonia as the pH stabilizer is used.

5. A method of manufacturing a rare-earth magnet according to claim 1, wherein

the second protective film is formed through electroplating with a second plating bath including a nickel source, a conductive salt, a pH stabilizer and an organic sulfur compound, and having a conductivity of 80 mS/cm or over.

6. A method of manufacturing a rare-earth magnet according to claim 5, wherein

the second plating bath including at least one kind selected form the group consisting of nickel sulfate, nickel chlorides, nickel

bromides, nickel acetate and nickel pyrophosphate as the nickel source is used.

7. A method of manufacturing a rare-earth magnet according to claim 5, wherein

the second plating bath including at least one kind selected from the group consisting of ammonium sulfate, sodium sulfate, potassium sulfate, lithium sulfate, magnesium sulfate, ammonium chloride, sodium chloride, potassium chloride, lithium chloride, magnesium chloride, ammonium bromide, sodium bromide, potassium bromide, lithium bromide and magnesium bromide as the conductive salt is used.

8. A method of manufacturing a rare-earth magnet according to claim 5, wherein

the second plating bath including at least one kind selected from the group consisting of boric acid, ammonium borate, sodium borate, potassium borate, lithium borate, magnesium borate and ammonia as the pH stabilizer is used.

9. A method of manufacturing a rare-earth magnet, comprising the steps of:

forming a first protective film including nickel on a magnet body including a rare-earth element through electroplating with a

first plating bath including 0.3 mol/l to 0.7 mol/l of nickel ions, at least one kind selected from the group consisting of sulfate ions, chlorine ions, bromine ions, acetate ions and pyrophosphate ions, at least one kind selected from the group consisting of sodium ions, potassium ions, lithium ions, magnesium ions and ammonium ions, and at least one kind selected from the group consisting of borate ions and ammonium ions, and having a conductivity of 80 mS/cm or over; and

forming a second protective film including nickel and sulfur on the first protective film.

10. A method of manufacturing a rare-earth magnet according to claim 9, wherein

the second protective film is formed through electroplating with a second plating bath including nickel ions, at least one kind selected from the group consisting of sulfate ions, chlorine ions, bromine ions, acetate ions and pyrophosphate ions, at least one kind selected from the group consisting of sodium ions, potassium ions, lithium ions, magnesium ions and ammonium ions, at least one kind selected from the group consisting of borate ions and ammonium ions, and an organic sulfur compound, and having a conductivity of 80 mS/cm or over.

11. A plating bath, comprising

a nickel source;

a conductive salt; and

a pH stabilizer,

wherein the concentration of the nickel source is 0.3 mol/l to 0.7 mol/l on a nickel atom basis, and

the conductivity of the plating bath is 80 mS/cm or over.

12. A plating bath according to claim 11, wherein

the plating bath is used to form a protective film on a magnet body including a rare-earth element through electroplating.

13. A plating bath according to claim 11, wherein

as the nickel source, at least one kind selected from the group consisting of nickel sulfate, nickel chlorides, nickel bromides, nickel acetate and nickel pyrophosphate is included.

14. A plating bath according to claim 11, wherein

as the conductive salt, at least one kind selected from the group consisting of ammonium sulfate, sodium sulfate, potassium sulfate, lithium sulfate, magnesium sulfate, ammonium chloride, sodium chloride, potassium chloride, lithium chloride, magnesium chloride, ammonium bromide, sodium bromide, potassium bromide, lithium bromide and magnesium bromide is included.

15. A plating bath according to claim 11, wherein

as the pH stabilizer, at least one kind selected from the group consisting of boric acid, ammonium borate, sodium borate, potassium borate, lithium borate, magnesium borate and ammonia is used.

16. A plating bath, comprising:

0.3 mol/l to 0.7 mol/l of nickel ions;

at least one kind selected from the group consisting of sulfate ions, chlorine ions, bromine ions, acetate ions and pyrophosphate ions;

at least one kind selected from the group consisting of sodium ions, potassium ions, lithium ions, magnesium ions and ammonium ions; and

at least one kind selected from the group consisting of borate ions and ammonium ions,

wherein the conductivity of the plating bath is 80 mS/cm or over.

17. A plating bath, comprising:

a nickel source;

a conductive salt;

a pH stabilizer; and

an organic sulfur compound,

wherein the conductivity of the plating bath is 80 mS/cm or over.

18. A plating bath according to claim 17, wherein

the plating bath is used to form a second protective film on a magnet body including a rare-earth element with a first protective film including nickel in between through electroplating.

19. A plating bath according to claim 17, wherein

as the nickel source, at least one kind selected from the group consisting of nickel sulfate, nickel chlorides, nickel bromides, nickel acetate and nickel pyrophosphate is included.

20. A plating bath according to claim 17, wherein

as the conductive salt, at least one kind selected from the group consisting of ammonium sulfate, sodium sulfate, potassium sulfate, lithium sulfate, magnesium sulfate, ammonium chloride, sodium chloride, potassium chloride, lithium chloride, magnesium chloride, ammonium bromide, sodium bromide, potassium bromide, lithium bromide and magnesium bromide is included.

21. A plating bath according to claim 17,

as the pH stabilizer, at least one kind selected from the group consisting of boric acid, ammonium borate, sodium borate,

potassium borate, lithium borate, magnesium borate and ammonia is used.

22. A plating bath, comprising:

nickel ions;

at least one kind selected from the group consisting of sulfate ions, chlorine ions, bromine ions, acetate ions and pyrophosphate ions;

at least one kind selected from the group consisting of sodium ions, potassium ions, lithium ions, magnesium ions and ammonium ions;

at least one kind selected from the group consisting of borate ions and ammonium ions; and

an organic sulfur compound,

wherein the conductivity of the plating bath is 80 mS/cm or over.